Does Your Money Really Grow on Trees?

What is the Time Value of Money?

Of course you know by now that money really doesn't grow on trees. But what you may not know is that, in addition to earning a paycheck, you can make your money work for you and grow through savings and investments.

Time value of money (TVM) is the concept used to compare and predict the value of something you own or the cost of borrowing money now or in the future. Over time, your money works **for** you, in the case of saving, or **against** you when you owe money to creditors.

- If you put your money into a savings account, you can **earn interest** on your savings and eventually, interest on interest.
- When you **pay interest** on credit cards or loans, you are promising to pay money in the future and you will have less money to use.

.

Terms related to the time value of money

Do you know these terms that are used to discuss the time value of money?

Term	Definition
Annual Percentage Rate (APR)	The yearly interest rate paid on a loan that takes into account compounding.
Annual Percentage Yield (APY), also known as **effective yield or rate of return**	Annual rate of interest you receive on an account when **compounding** is taken into account. When comparing interest rates, this is the figure you should compare.
Compound Interest	Interest earned or paid on the principal and interest from previous periods.
Compounding	How often interest is added to your account. Interest can be compounded daily, monthly, quarterly, and yearly. The more often this happens, the more interest you earn.
Inflation	When the prices of goods and services increase due to financial conditions around the country.
Interest Rate	Price of using money for a certain period of time. You receive it if you save and you pay it if you borrow money.
Simple interest	Interest earned only on the principal amount and not on interest.

Consider Saving Now

Start saving now by setting aside an amount each time you receive money. This way, you will be saving money on a regular basis. Before opening an account, know the rules on withdrawals, minimum balance requirements, and fees. Once you are earning a regular paycheck, you might set up automatic transfers from your checking account to a savings account or to a mutual fund.

When you receive a raise, plan to save more money from each paycheck.

Think about the following reasons to start saving now:

- To have enough money to cover **unexpected expenses** in the future
- To **stay out of debt**
- To **reach your goals** so you won't have to use credit or so you can reduce the amount you need to borrow to pay for a:
  - car
  - college
  - furniture
  - vacation
  - entertainment system
  - home

Setting Goals for Saving

Some of your goals require that you have money to pay for them. Planning ahead can help you determine how much you need to save weekly, monthly, or annually to meet your goals. The longer you have to reach your goal, the more compounding will help you. Below are some examples:

- **Short-term:** within the next year
  - school supplies, school trips, birthday gifts, vacation.
- **Mid-term:** more than 1 but less than 5 years
  - car, household appliances, home repairs
- **Long-term:** 5 years or longer
  - purchase a home, attend college, plan for children

How Fast Does Your Money Grow?

- Would you like your savings to double? If you invest $1,000 today, how many years will it take to double to $2,000?
- The **Rule of 72** is a quick way to calculate:
  - how long it takes to double your money if you earn a given rate of interest or
  - what rate of interest you need to earn if you have a certain number of years to double your money.
- Here is how it works: Divide the interest rate your savings will earn, or the number of years you have to save, into the number 72.
- **How long will it take?** If interest is compounded at a rate of 7 percent per year, your money will double in 10.3 years (72/7); if the rate is 6 percent, it will take 12 years (72/6). If college tuition costs are rising 8 percent per year, the cost of a college education would double in just over nine years (72/8).
- **What rate do you need to earn?** if you need $4,000 for a car in 3 years and you have $2,000 to invest now, you need to find an investment that will earn 24% (72/3), which is not a realistic goal in today's market. If you have eight years until you need the car, the investment would need to earn 9% (72/8), which is more realistic but will mean accepting some risk in the stock market. You could lower the interest rate you need to earn by saving more money each month.

Using Financial Calculators Available on the World Wide Web

Many financial calculators are available on the Internet. **Financial calculators are helpful in planning for short- and long-term financial goals.** *USA Today*'s financial calculators are available at http://www.usatoday.com/money/calculator.htm. Financial calculators can help you figure out how much interest you pay on credit card balances and loans and how much interest you might earn on savings accounts and other types of investments. They can also help you plan for college expenses.

- Using the financial calculator on *USA Today*'s web site, compute how long it will take your parents to save enough money for you to attend college for four years assuming your parents will pay $8,000 per year. Enter the following information on the Web site for the "savings" category and the "cost of college education" question.

Tuition and expenses in today's dollars	$8,000
Years of college	4
Years until college	4
College savings to date	0
Monthly amount you can save	$100
Estimated rate of return on investments	4.0%
Estimated inflation rate	3%
Your federal tax rate	28%
Your state tax rate	8%

Then click on "results."

- They would be paying a total of $37,754 for your college tuition over four years allowing for inflation.
- If they save only $100 per month they will have only $5,041.
- To save the $37,754 in four years, your parents will need to increase their savings from $100 to $749 or deposit $29,660 today. **Of course, if they have longer than 4 years it would be easier to save the amount needed.**
- If they use a special education account, such as a 529 college savings plan, the savings amount would be less since they wouldn't have to pay taxes on the interest earned.

Calculating Interest on a Savings Account with Compound Interest

Using the financial calculator available from the Bankrate.com web site, http://www.bankrate.com/gooword/calc/cdc/CertDeposit.asp?nav=sav&page=calc_home, calculate the amount of interest on a certificate of deposit (CD) from a bank with different kinds of compounding.

Initial Deposit	$1000
Months	120
Interest rate	4%
Compounding	monthly

Click on "calculate." If you click on "View Report" it will show you a report of how the compound interest is calculated. Then change the compounding to quarterly and recalculate. Repeat for monthly and annually. You should find the following information:

Type of compound interest	Annual percentage yield	Total return
Monthly	4.074%	$1490.83
Quarterly	4.060%	$1488.96
Semi-annually	4.040%	$1485.95
Annually	4.000%	$1480.24

You will earn more interest with monthly compounding than with yearly compounding. $10 does not seem like much, but check what it would be if you had $100,000 instead of $1,000.

How the Time Value of Money Can Work Against You

Any time that you pay interest on money you have borrowed through loans or from using credit cards, you will have less money to spend on things you need or want now. Go to http://www.usatoday.com/money/calculator.htm . Under "credit cards", click on "what will it take to pay off my balance?"

Amount Now Owed	$500
Future Monthly Charges	$50
Future Monthly Payments	$20
Annual Rate	18%
Annual Fee	0
Desired months to pay off	24
Future rate change	none

Click "Press Here to Calculate".

- At $20 you will never pay off the balance, because the finance charge, plus the new purchase, is more than your monthly payment.
- If you increase your payments to $75, and limit your new charges to under $50 a month, you can pay off the balance in 24 months. This means that you will have $55 ($75-$20) less to spend each month (on current needs and wants) for the next two years.

Use the back button on your browser to get back to the calculator. Change it to:

Amount Now Owed	$500
Future Monthly Charges	0
Future Monthly Payments	$20
Annual Rate	18%
Annual Fee	0
Desired months to pay off	24
Future rate change	none

The report tells you:

- If you stop putting new charges on your account, you need to pay $25 a month to pay the balance in full in 24 months.
- This still means you will have $55 a month less to spend ($50 that you would have put on your credit card plus the $5 increase in payment).
- If you continue to make $20 payments it will take 32 months to pay the balance in full, assuming no new purchases are made.

How Loans are Influenced by the Time Value of Money

If you decide to take out a loan (personal, school, or new home) you will pay interest on your balance. Interest can really add up over time. Using *USA Today's* financial calculator (http://www.usatoday.com/money/calculator.htm) for a "personal loan," calculate the payment of the following example (click on "how much will my payments be?"):

Amount borrowed	$10,000
Interest rate	8%
Months until repaid	30
Your state and federal tax rate	23%
Future rate change	none

Click results.

- Your monthly payments will be $369 for 30 months.
- You will pay $1,066 in interest.
- This means the total amount you will repay is $11,066.
- Holding the interest rate constant, the longer it takes to pay off a loan, the more interest you will pay.

- If you choose a five-year repayment period (60 months), your monthly payment will be $203, but you will pay $2,166 interest. The total amount repaid would be $12,166.

Using the retail and classified advertisements in the newspaper, find at least three things that you would like to purchase. How will you buy each? How long will it take to save for each item? Will someone help you with financing? Is this something that you want or need?

Time Value of Money Learning Extensions

Jason invests $3,000 a year for ten years, beginning at age 21. Sarah waits 10 years, then invests $3,000 a year for 35 years. They both earn 8% on their investment. Compare the total contributions and the total value of retirement for Jason and Sarah.

Jason

Age	Years	Contributions	Year-End Value
21	1	$3,000	$3,240
22	2	3,000	6,739
23	3	3,000	10,518
24	4	3,000	14,600
25	5	3,000	19,008
26	6	3,000	23,768
27	7	3,000	28,910
28	8	3,000	34,463
29	9	3,000	40,460
30	10	3,000	46,936
35	15	0	68,965
40	20	0	101,332
45	25	0	148,890
50	30	0	218,769
55	35	0	321,443
60	40	0	472,306
65	45	0	693,972

Jason's Value at Retirement _____

Less Total Contributions _____

Net Earnings _____

Sarah

Age	Years	Contributions	Year-End Value
21-30	10	0	0
31	11	$3,000	$3,240
32	12	3,000	6,739
33	13	3,000	10,518
34	14	3,000	14,600
35	15	3,000	19,008
36	16	3,000	23,768
37	17	3,000	28,910
38	18	3,000	34,463
39	19	3,000	40,460
40	20	3,000	46,936
45	25	15,000	87,973
50	30	15,000	148,269
55	35	15,000	236,863
60	40	15,000	367,038
65	45	15,000	558,306

Sarah's Value at Retirement _____

Less Total Contributions _____

Net Earnings _____